



1985 LOWER COOK INLET SOCKEYE (Oncorhynchus nerka) AND CHUM
SALMON (O. keta) SALMON, AGE, WEIGHT, AND LENGTH STATISTICS

By:
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September 1986

ADF&G TECHNICAL DATA REPORTS

This series of reports is designed to facilitate prompt reporting of data from studies conducted by the Alaska Department of Fish and Game, especially studies which may be of direct and immediate interest to scientists of other agencies.

The primary purpose of these reports is presentation of data. Description of programs and data collection methods is included only to the extent required for interpretation of the data. Analysis is generally limited to that necessary for clarification of data collection methods and interpretation of the basic data. No attempt is made in these reports to present analysis of the data relative to its ultimate or intended use.

Data presented in these reports is intended to be final, however, some revisions may occasionally be necessary. Minor revision will be made via errata sheets. Major revisions will be made in the form of revised reports.

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TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES	i
LIST OF FIGURES	ii
ABSTRACT	iii
INTRODUCTION	1
METHODS	1
RESULTS AND DISCUSSION	8
Sockeye Salmon	8
Chum Salmon	13
LITERATURE CITED	16

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Aialik Bay commercial catch of sockeye salmon by sex, age, length (mm), and weight (kg), 1985	9
2. Nuka Bay commercial catch of sockeye salmon by sex, age, length (mm), and weight (kg), 1985	10
3. China Poot Bay commercial catch of sockeye salmon by sex, age, length (mm), and weight (kg), 1985	11
4. Kasitsna Bay commercial set net catch of sockeye salmon by sex, age, length (mm), and weigh (kg), 1985	12
5. Chenik Lake commercial catch of sockeye salmon by sex, age, length (mm), and weight (kg), 1985	14
6. Tonsina Creek commercial catch of chum salmon by sex, age, length (mm), and weight (kg), 1985	15

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Lower Cook Inlet Management Area	2
2. Salmon fishing subdistricts in the Southern and Outer Districts of Cook Inlet	3
3. Salmon fishing subdistricts in the Eastern District of Cook Inlet	4
4. Salmon fishing subdistricts in the Kamishak Bay Districts of Cook Inlet	5
5. Set net locations in the Tutka Bay and Barabara Creek subdistricts of Lower Cook Inlet	6
6. Set net locations in the Seldovia Bay and Port Graham subdistricts of Lower Cook Inlet	7

ABSTRACT

This data report is the third in a series containing commercial catch sampling data for the Lower Cook Inlet area. Included herein is a compilation of the 1985 age, weight, and length sampling data for sockeye and chum salmon stocks in the Lower Cook Inlet management area. A total of 2,080 sockeye and 122 chum salmon readable scale samples was taken from 6 fisheries during the 1985 season. The 1985 Lower Cook Inlet commercial harvest of sockeye salmon was 279,000 and of chum salmon was 31,000.

KEY WORDS: sockeye salmon, chum salmon, *Oncorhynchus*, biological sampling, age, weight, and length.

INTRODUCTION

The Lower Cook Inlet management area is divided into five management districts (Figure 1). All, except the Barren Islands District, are salmon management districts which are further divided into 25 subdistricts or sections for more precise management of the discrete stocks of salmon (Figures 2-6). Many of these subdistricts and sections contain stocks of sockeye (*Oncorhynchus nerka*) and chum (*O. keta*) salmon, while others are primarily pink salmon (*O. gorbuscha*) producing systems. Harvests of sockeye and chum salmon have averaged under 20% of the total harvest for the area for the past 30 years. These two species now account for over 60% of the total ex-vessel value of salmon to Lower Cook Inlet fishermen. The commercial harvest of sockeye and chum salmon totaled 279,000 and 31,000, respectively.

METHODS

The stocks of sockeye and chum salmon to be sampled in Lower Cook Inlet were located in 19 different systems spread throughout a 386 km (240 mi) area from McNeil River in the west to Seward in the east (Figures 2-6). Nine sockeye salmon stocks were identified, located at Resurrection Bay, Aialik Bay, Delight and Desire Lakes, English Bay Lakes system, China Poot Bay (Leisure Lake), Kamishak-Douglas River, Mikfik Lake, and Chenik Lake. Eleven chum salmon stocks were identified, located at Tonsina Creek, Island Creek, Dogfish Lagoon, Tutka Bay, Silver Beach, Kamishak River, McNeil River, Bruin Bay, Ursus Cove, Cottonwood and Iniskin Bays.

Logistics and very limited funding severely hampered sampling efforts in 1985. Weather prevented getting larger samples of the more remote sockeye returns. In addition, sampling of the Southern District set gillnet catches was hampered by a cooperative established to market set gillnet caught salmon. In the past, radio communication with large processors and a firm pickup schedule by the tender could be used to plan sampling trips. Sockeye salmon returns were generally good in 1985. The commercial harvest totaled 279,000.

Chum salmon returns were extremely poor to all districts in 1985. Commercial catches totaled 31,000. Most harvests occurred incidentally during fisheries directed at other species.

Standard sampling procedures for age, weight, length (AWL) by sex were used as recommended by the Statewide Stock Separation Project (Sharr 1981). Fish were measured to the nearest millimeter (mm) from the middle of the eye to the fork of the tail and fish were weighed to the nearest 0.05 kilogram (kg). Sample numbers, as recommended in a memo concerning statewide standards for AWL sample sizes, (Bernard 1982) were attempted but were not always obtained.

Scales were read using the Gilbert-Rich age designation (Gilbert-Rich Formula - Total years of life at maturity in large type - year of life at outmigration from fresh water in subscript). All samples were entered into

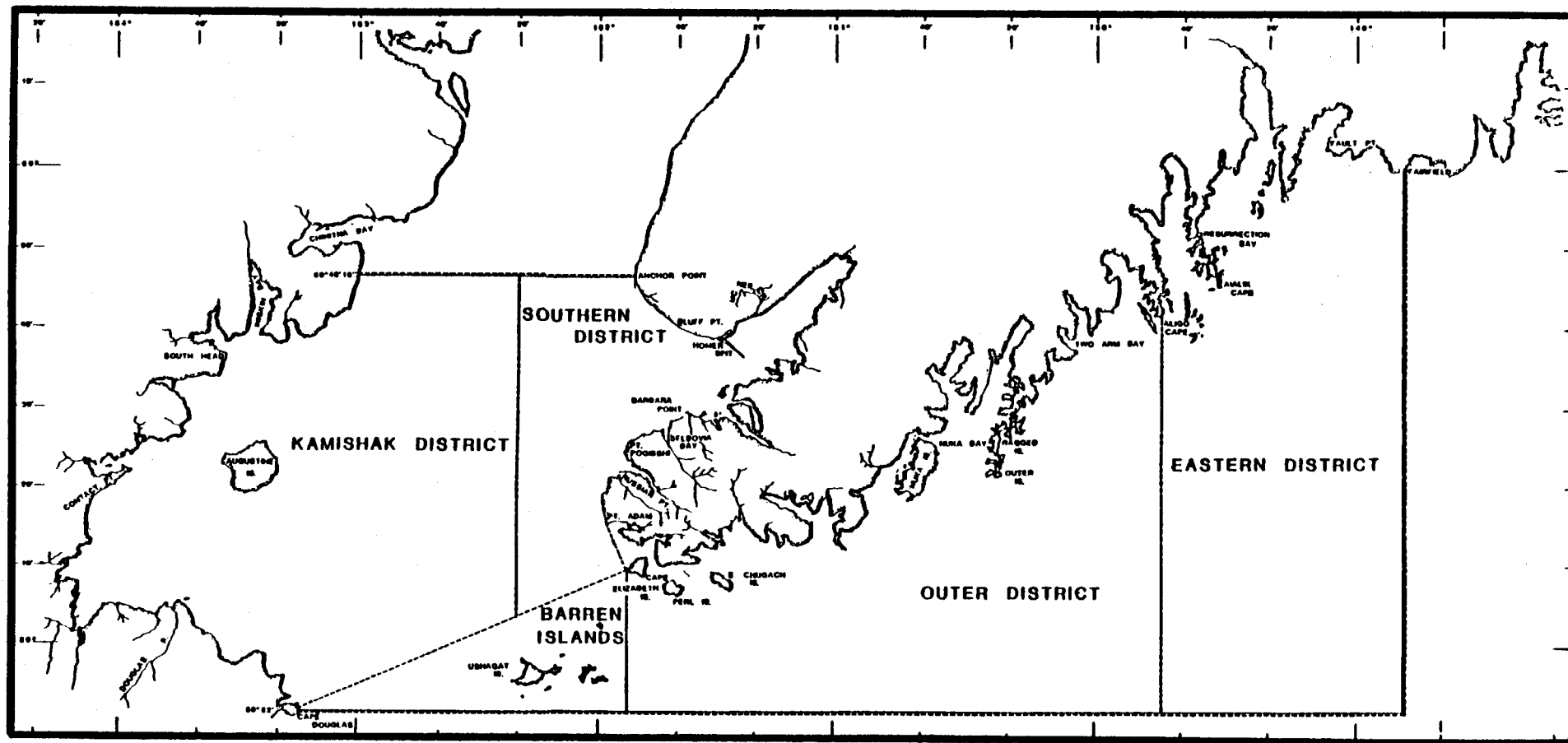


Figure 1. Lower Cook Inlet Management Area.

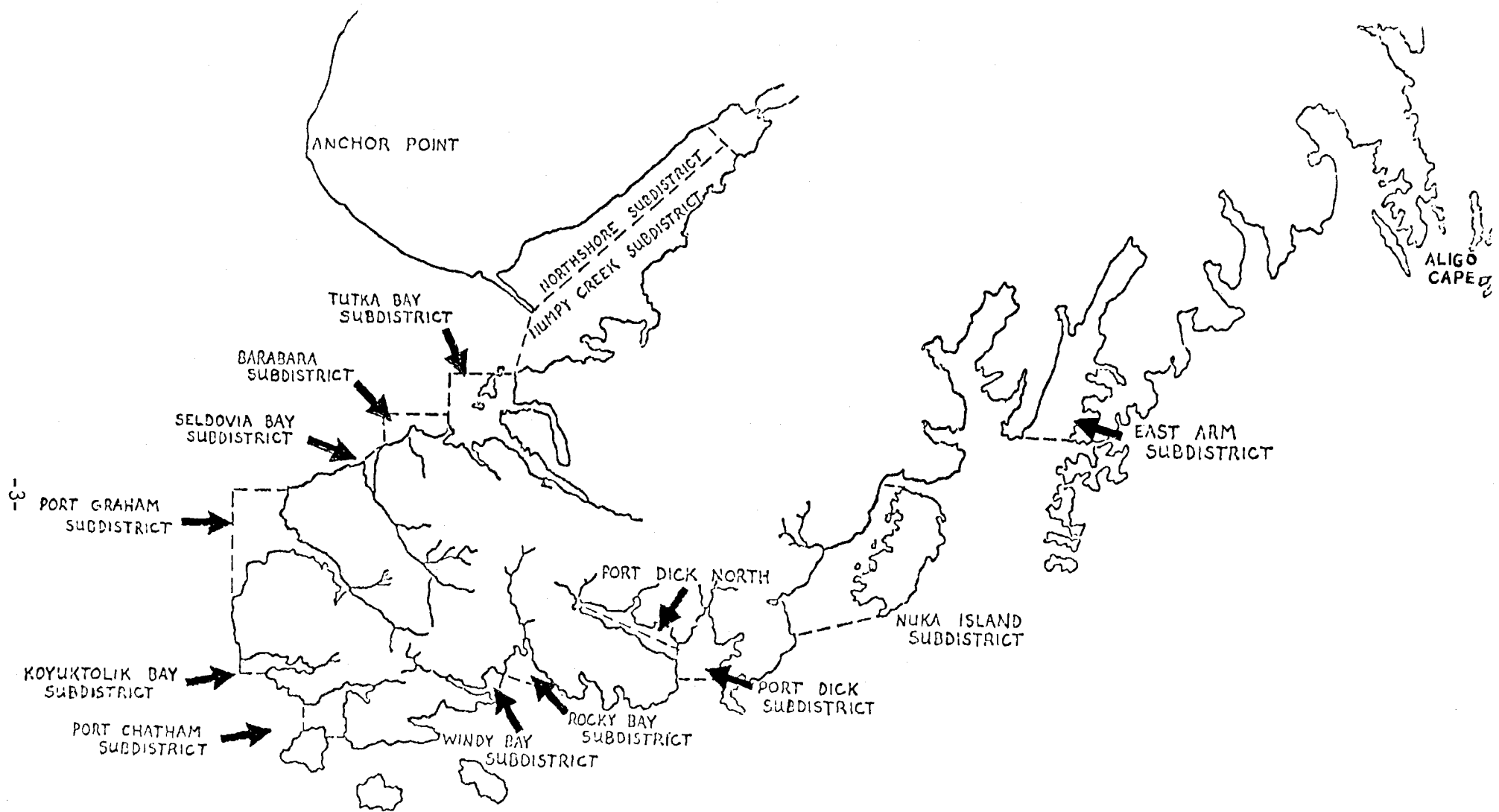
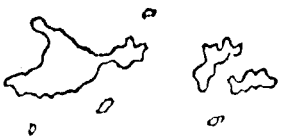


Figure 2. Salmon fishing subdistricts in the Southern and Outer Districts of Cook Inlet.



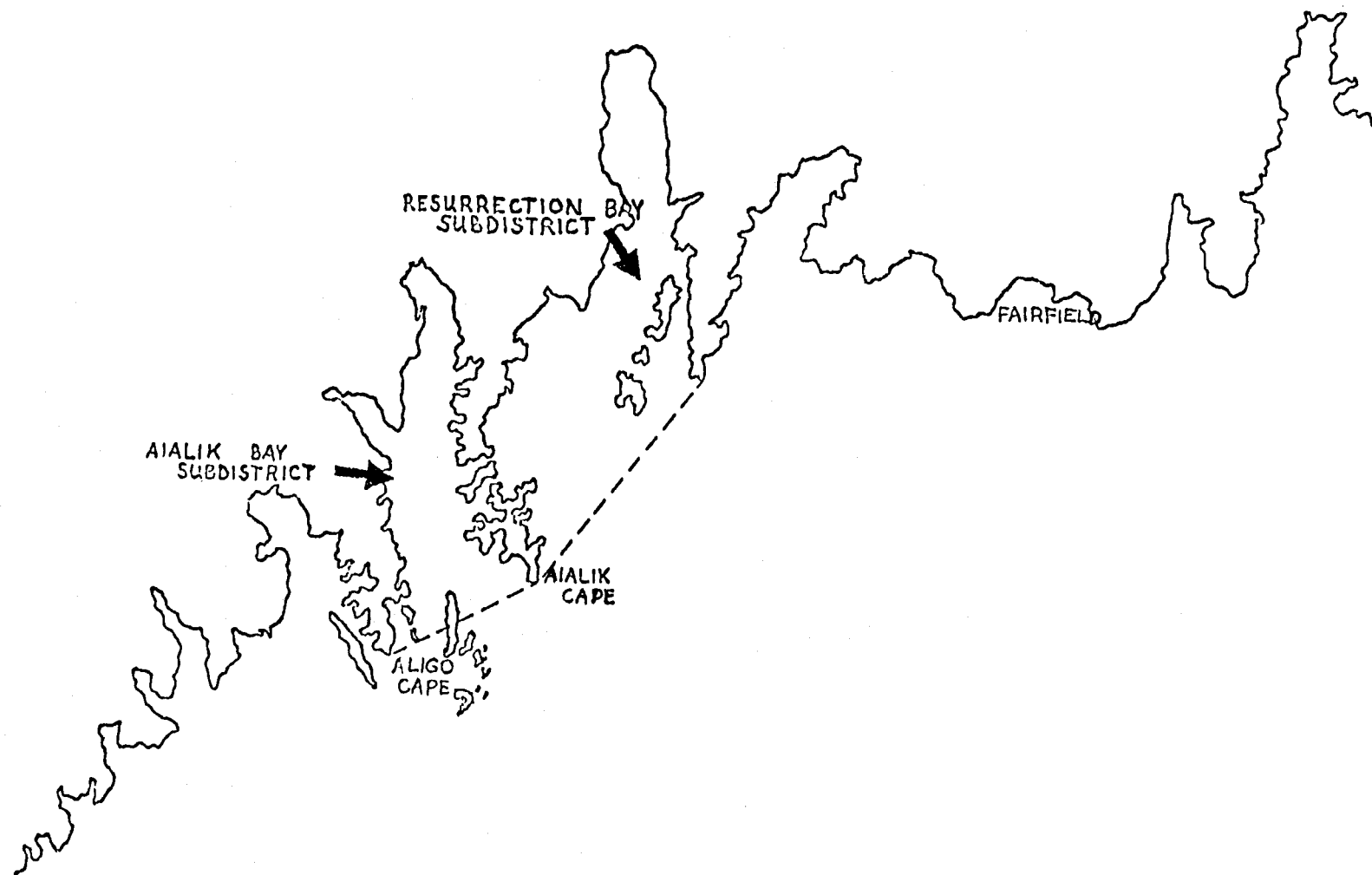


Figure 3. Salmon fishing subdistricts in the Eastern District of Cook Inlet.

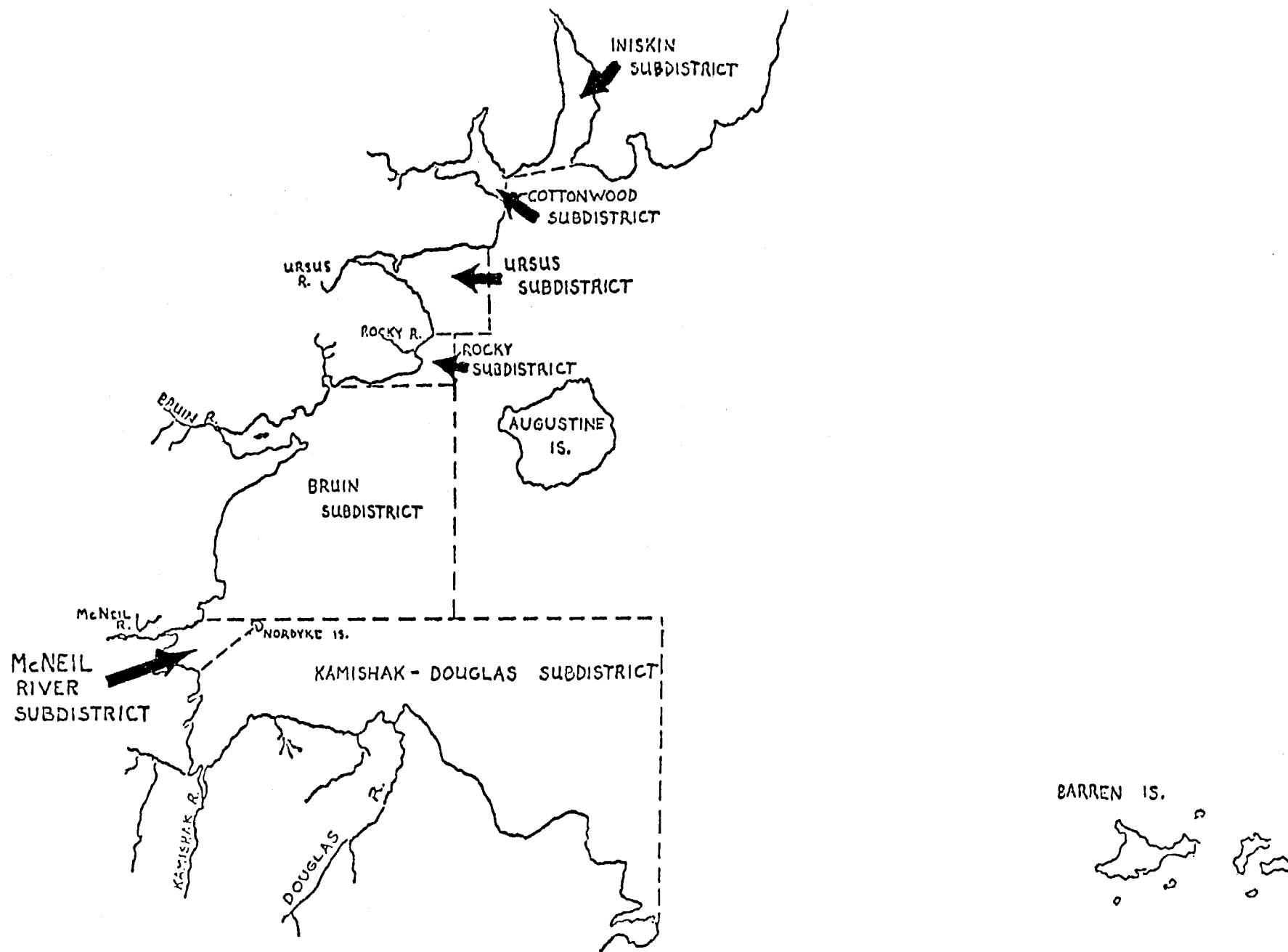


Figure 4. Salmon fishing subdistricts in the Kamishak Bay District of Cook Inlet.

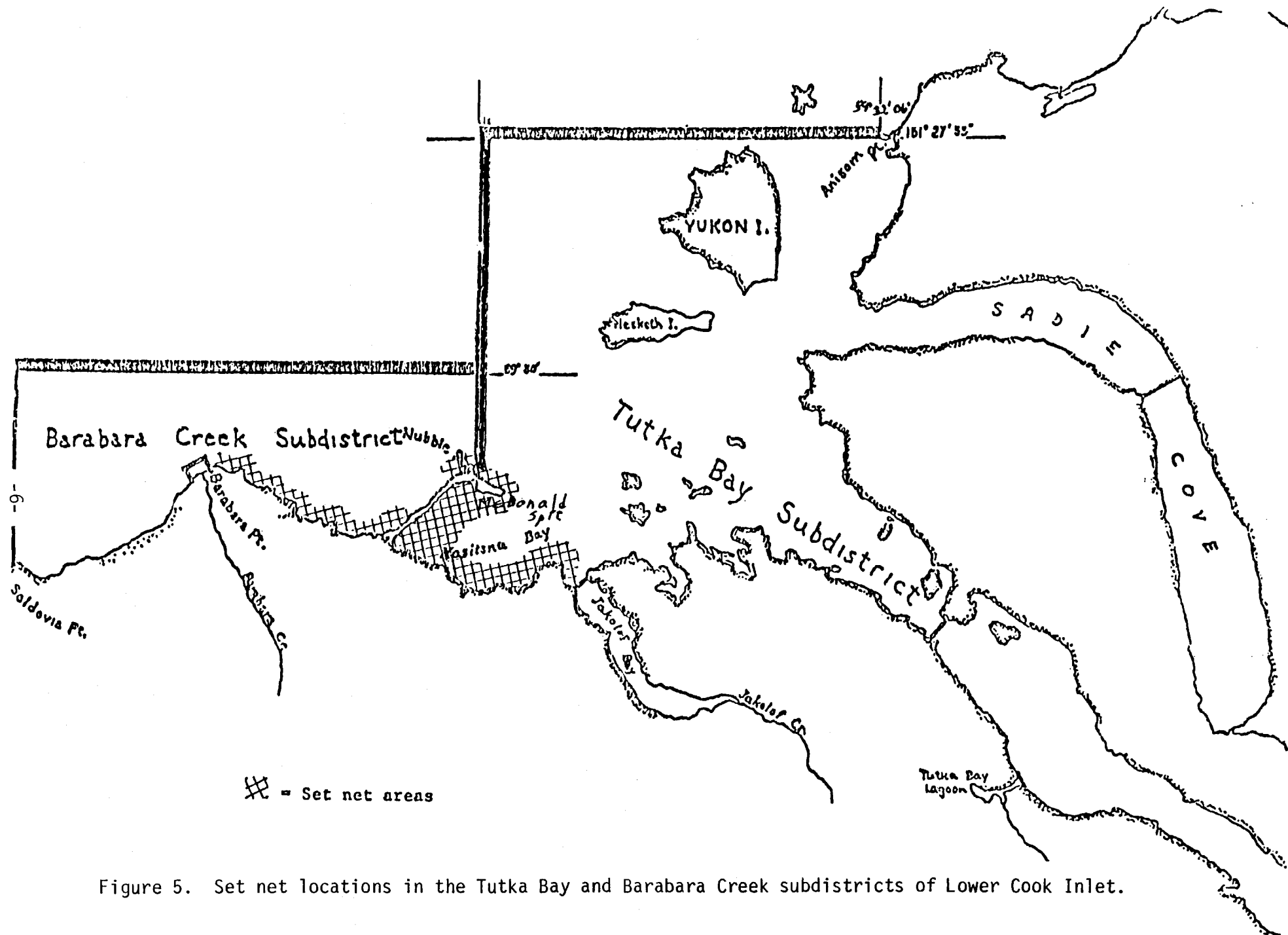


Figure 5. Set net locations in the Tutka Bay and Barabara Creek subdistricts of Lower Cook Inlet.

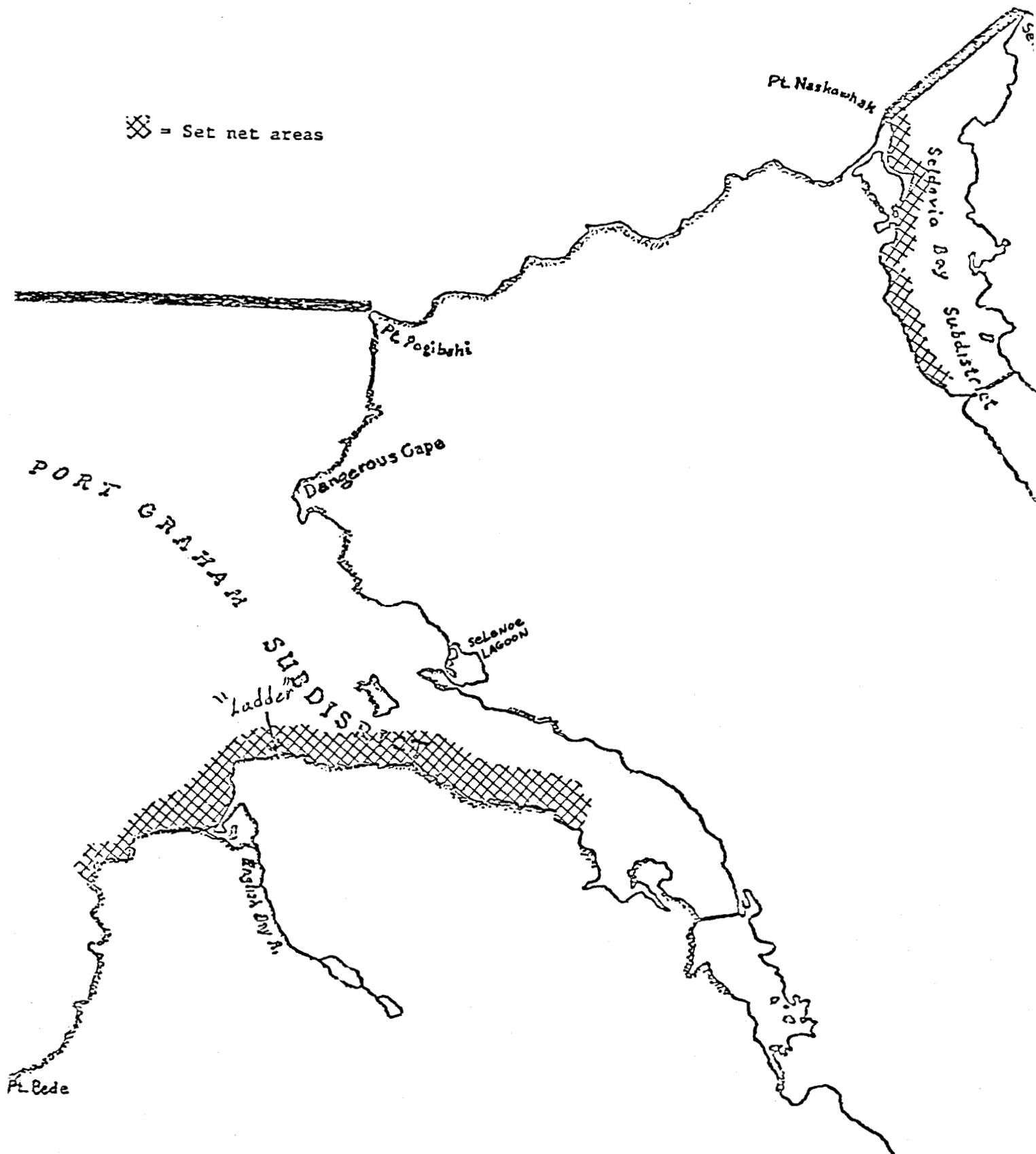


Figure 6. Set net locations in the Seldovia Bay and Port Graham subdistricts of Lower Cook Inlet.

files on a Vector Graphics computer. Data were analyzed by an AWL summary program (Yuen 1983) with statistical calculations detailed in Yuen, Bue, and Meacham (1981). The harvest figures listed for the various areas in 1985 are preliminary estimates, but should be within 10% of final figures.

RESULTS AND DISCUSSION

Sockeye Salmon

Sockeye salmon were sampled from all major producing systems in Lower Cook Inlet with the exception of Mikfik Lake and the Southern District set gill nets outside of Kasitsna Bay. Emphasis continued on sampling the China Poot return and the set gillnet catches from Kasitsna Bay to Seldovia Bay to enable later analysis of the interception of China Poot sockeye by the gillnet fishery.

Aialik Lake, often referred to as Pederson Lake, had another strong return for the fourth year in a row. The harvest of over 24,000 sockeye was the third highest on record. This year's harvest was comprised of 73% three-ocean fish (Table 1). Average lengths were slightly lower than previous years for age 4₂, 5₂, 5₃, and 6₃ sockeye, but average weights were 0.25-0.50 kg higher (Schroeder 1984 and 1985).

The Nuka Bay sockeye salmon harvest of 91,630 was a new record for the area. As was the case for Aialik Bay, the Nuka Bay harvest was comprised of over 76% three-ocean sockeye salmon (Table 2). Average lengths and weights for 4₂, 5₂, 5₃, and 6₃ sockeye salmon was very similar to the previous 2 years (Schroeder 1984 and 1985).

The 1985 sockeye salmon harvest in China Poot Bay (from the Leisure Lake system) was considerably below the previous two years. The harvest of 57,425 was comprised of only 52% age 4₂ sockeye (Table 3), which represents a significant shift from previous years where returns were 92%-98% age 4₂ fish (Schroeder 1984 and 1985). Age 5₂ and 5₃ sockeye comprised 46% of the harvest in 1985. All three of these age classes had larger average lengths and weights than 1984.

Age composition of the setnet catch in Kasitsna Bay in 1985 (Table 4) was similar to that in 1984 for setnet harvest from Tutka Bay (Schroeder 1985). Based solely on subjective evaluation of the freshwater growth zone by this author who aged the scale samples, sockeye salmon from the Leisure Lake (China Poot) system have distinctively large freshwater growth. If this subjective evaluation is correct, sockeye from this system should be a prime candidate for stock separation through scale pattern analysis. This author took the liberty to subjectively identify Leisure Lake sockeye caught in the Kasitna Bay set gillnet fishery in 1984 and 1985. In 1984, 81% of age 4₂ sockeye were subjectively identified as Leisure Lake fish. In 1985, 14% of age 4₂, 12% of age 5₂, and 92% of age 5₃ sockeye salmon were subjectively identified as Leisure Lake fish.

The Chenik Lake sockeye salmon samples contained age classes 4¹, 5₃, 6₃, and 6₂ not detected in the 1983 and 1984 samples which were all age 4₂ and

Table 1. Aialik Bay commercial catch of sockeye salmon by sex, age, length, (mm), and weight (kg), 1985.

	41	42	43	AGE GROUP			62	63	TOTAL
				52	53				
MALE	0	1,287	76	6,434	2,271	76	1,514		11,658
PERCENT	.00	5.35	.32	26.73	9.43	.32	6.29		48.43
AV LENGTH	.00	500.35	380.00	569.05	509.73	648.00	582.40		550.93
STD ERROR	.00	9.98	.00	2.71	7.14	.00	6.34		2.46
SAMP SIZE	0	17	1	85	30	1	20		154
AV WEIGHT	.00	2.63	1.30	3.50	2.56	4.80	3.76		3.25
STD ERROR	.00	.16	.00	.07	.12	.00	.14		.05
SAMP SIZE	0	5	1	51	17	1	14		89
FEMALE	76	1,287	0	7,798	1,438	0	1,817		12,416
PERCENT	.32	5.35	.00	32.39	5.97	.00	7.55		51.57
AV LENGTH	539.00	497.47	.00	551.15	493.47	.00	548.38		538.43
STD ERROR	.00	4.59	.00	1.76	4.11	.00	5.25		1.50
SAMP SIZE	1	17	0	103	19	0	24		164
AV WEIGHT	2.95	2.28	.00	3.04	2.66	.00	3.20		2.94
STD ERROR	.00	.08	.00	.04	.21	.00	.10		.04
SAMP SIZE	1	9	0	54	7	0	12		83
BOTH SEX	76	2,574	76	14,232	3,709	76	3,331		24,074
PERCENT	.32	10.69	.32	59.12	15.41	.32	13.84		100.00
AV LENGTH	539.00	498.91	380.00	559.24	503.43	648.00	563.84		544.48
STD ERROR	.00	5.49	.00	1.56	4.65	.00	4.06		1.42
SAMP SIZE	1	34	1	188	49	1	44		318
AV WEIGHT	2.95	2.46	1.30	3.25	2.60	4.80	3.45		3.09
STD ERROR	.00	.07	.00	.04	.10	.00	.09		.03
SAMP SIZE	1	14	1	105	24	1	26		172

Table 2. Nuka Bay commercial catch of sockeye salmon by sex, age, length (mm), and weight (kg), 1985.

	AGE GROUP						
	41	42	52	53	63	74	TOTAL
MALE	0	3,757	30,057	2,922	2,713	209	39,658
PERCENT	.00	4.10	32.80	3.19	2.96	.23	43.28
AV LENGTH	.00	499.72	571.42	508.43	573.46	534.00	559.93
STD ERROR	.00	5.16	1.82	4.65	4.35	.00	1.53
SAMP SIZE	0	18	144	14	13	1	190
AV WEIGHT	.00	2.16	3.12	2.27	3.13	.00	2.97
STD ERROR	.00	.08	.04	.12	.12	.00	.04
SAMP SIZE	0	9	94	6	10	0	119
FEMALE	209	7,514	33,395	6,053	4,592	209	51,972
PERCENT	.23	8.20	36.45	6.61	5.01	.23	56.72
AV LENGTH	547.00	487.44	548.78	498.31	538.64	547.00	533.12
STD ERROR	.00	4.50	1.52	5.60	4.67	.00	1.41
SAMP SIZE	1	36	160	29	22	1	249
AV WEIGHT	.00	1.88	2.65	1.94	2.66	.00	2.46
STD ERROR	.00	.06	.03	.08	.12	.00	.03
SAMP SIZE	0	21	95	16	10	0	142
BOTH SEX	209	11,271	63,452	8,975	7,305	418	91,630
PERCENT	.23	12.30	69.25	9.79	7.97	.46	100.00
AV LENGTH	547.00	491.53	559.50	501.60	551.57	540.50	544.72
STD ERROR	.00	3.46	1.18	4.07	3.35	.00	1.04
SAMP SIZE	1	54	304	43	35	2	439
AV WEIGHT	.00	1.97	2.87	2.05	2.83	.00	2.68
STD ERROR	.00	.05	.03	.07	.09	.00	.02
SAMP SIZE	0	30	189	22	20	0	261

Table 3. China Poot Bay commercial catch of sockeye salmon by sex, age, length (mm), and weight (kg), 1985.

	AGE GROUP					
	42	52	53	62	63	TOTAL
MALE	15,161	6,444	8,528	190	0	30,323
PERCENT	26.40	11.22	14.85	.33	.00	52.80
AV LENGTH	481.04	539.32	496.56	568.00	.00	498.33
STD ERROR	2.24	3.15	3.38	.00	.00	1.61
SAMP SIZE	80	34	45	1	0	160
AV WEIGHT	2.26	2.91	2.43	3.85	.00	2.46
STD ERROR	.03	.05	.04	.00	.00	.02
SAMP SIZE	40	23	24	1	0	88
FEMALE	14,783	5,117	6,633	0	569	27,102
PERCENT	25.74	8.91	11.55	.00	.99	47.20
AV LENGTH	482.42	539.15	492.97	.00	547.00	497.07
STD ERROR	1.68	4.53	3.46	.00	13.32	1.54
SAMP SIZE	78	27	35	0	3	143
AV WEIGHT	2.11	2.91	2.26	.00	2.88	2.31
STD ERROR	.02	.08	.06	.00	.08	.03
SAMP SIZE	32	16	26	0	3	77
BOTH SEX	29,944	11,561	15,161	190	569	57,425
PERCENT	52.14	20.13	26.40	.33	.99	100.00
AV LENGTH	481.72	539.24	494.99	568.00	547.00	497.74
STD ERROR	1.41	2.66	2.43	.00	13.32	1.12
SAMP SIZE	158	61	80	1	3	303
AV WEIGHT	2.19	2.91	2.36	3.85	2.88	2.39
STD ERROR	.02	.04	.04	.00	.08	.02
SAMP SIZE	72	39	50	1	3	165

Table 4. Kasitsna Bay commercial set gillnet catch of sockeye salmon by sex, age, length (mm), and weight (kg), 1985.

	AGE GROUP				TOTAL
	42	52	53	63	
MALE	1,511	2,855	1,175	839	6,380
PERCENT	13.04	24.65	10.14	7.24	55.08
AV LENGTH	498.67	563.41	511.71	583.60	541.21
STD ERROR	9.62	8.21	13.53	6.99	5.07
SAMP SIZE	9	17	7	5	38
AV WEIGHT	2.33	3.25	2.53	3.30	2.91
STD ERROR	.09	.25	.18	.00	.11
SAMP SIZE	3	4	5	1	13
FEMALE	839	2,686	1,007	672	5,204
PERCENT	7.24	23.19	8.69	5.80	44.92
AV LENGTH	485.20	538.38	508.33	550.25	525.52
STD ERROR	12.04	4.73	6.99	4.99	3.46
SAMP SIZE	5	16	6	4	31
AV WEIGHT	2.40	2.87	2.43	2.88	2.71
STD ERROR	.10	.10	.11	.09	.06
SAMP SIZE	2	7	6	3	18
BOTH SEX	2,350	5,541	2,182	1,511	11,584
PERCENT	20.29	47.83	18.84	13.04	100.00
AV LENGTH	493.86	551.28	510.15	568.77	534.16
STD ERROR	7.53	4.81	7.97	4.47	3.20
SAMP SIZE	14	33	13	9	69
AV WEIGHT	2.35	3.07	2.48	3.11	2.82
STD ERROR	.07	.11	.10	.07	.06
SAMP SIZE	5	11	11	4	31

52 fish (Table 5 and Schroeder 1984 and 1985). These results may be a function of relatively small sample sizes in all years. Average lengths table for these two age classes were similar to 1984 data, but average weights were 0.3 to 0.4 kg higher.

Chum Salmon

Tonsina Creek located in Resurrection Bay was the only area where chum salmon were sampled in 1985. Age four and five chum salmon comprised over 94% of the harvest (Table 6). Average lengths and weights were similar to past years. Age six salmon were observed for the first time and the 3.46% age three presence is a good indication of a potentially strong return in future years.

Table 5. Chenik Lake commercial catch of sockeye salmon by sex, age, length (mm), and weight (kg), 1985.

	AGE GROUP						TOTAL
	41	42	52	53	62	63	
MALE	0	750	3,875	0	0	0	4,625
PERCENT	.00	7.06	36.47	.00	.00	.00	43.53
AV LENGTH	.00	497.94	568.33	.00	.00	.00	556.92
STD ERROR	.00	5.13	2.44	.00	.00	.00	2.21
SAMP SIZE	0	18	93	0	0	0	111
AV WEIGHT	.00	2.08	2.81	.00	.00	.00	2.69
STD ERROR	.00	.06	.07	.00	.00	.00	.05
SAMP SIZE	0	8	27	0	0	0	35
FEMALE	83	708	4,916	125	42	125	5,999
PERCENT	.78	6.66	46.27	1.18	.40	1.18	56.47
AV LENGTH	547.00	485.00	542.24	467.33	515.00	537.00	533.69
STD ERROR	1.00	4.86	2.12	20.46	.00	23.63	1.94
SAMP SIZE	2	17	118	3	1	3	144
AV WEIGHT	3.00	1.88	2.44	.00	.00	3.60	2.40
STD ERROR	.00	.09	.06	.00	.00	.00	.05
SAMP SIZE	1	3	27	0	0	1	32
BOTH SEX	83	1,458	8,791	125	42	125	10,624
PERCENT	.78	13.72	82.75	1.18	.40	1.18	100.00
AV LENGTH	547.00	491.66	553.74	467.33	515.00	537.00	543.80
STD ERROR	1.00	3.54	1.60	20.46	.00	23.63	1.46
SAMP SIZE	2	35	211	3	1	3	255
AV WEIGHT	3.00	1.98	2.60	.00	.00	3.60	2.53
STD ERROR	.00	.05	.05	.00	.00	.00	.04
SAMP SIZE	1	11	54	0	0	1	67

Table 6. Tonsina Creek commercial catch of chum salmon by sex, age, length (mm), and weight (kg), 1985.

	AGE GROUP				
	31	41	51	61	TOTAL
MALE	69	1,175	760	69	2,073
PERCENT	2.30	39.09	25.28	2.30	68.96
AV LENGTH	562.50	624.74	643.05	577.00	627.79
STD ERROR	17.50	6.48	8.52	42.00	5.05
SAMP SIZE	2	34	22	2	60
AV WEIGHT	3.00	4.33	5.09	2.80	4.51
STD ERROR	.00	.28	.28	.00	.18
SAMP SIZE	1	11	11	1	24
FEMALE	35	518	380	0	933
PERCENT	1.16	17.23	12.64	.00	31.04
AV LENGTH	615.00	586.53	613.64	.00	598.64
STD ERROR	.00	9.06	11.02	.00	6.74
SAMP SIZE	1	15	11	0	27
AV WEIGHT	4.00	3.70	3.85	.00	3.77
STD ERROR	.00	.26	.37	.00	.21
SAMP SIZE	1	5	5	0	11
BOTH SEX	104	1,693	1,140	69	3,006
PERCENT	3.46	56.32	37.92	2.30	100.00
AV LENGTH	580.17	613.05	633.25	577.00	618.74
STD ERROR	11.67	5.28	6.77	42.00	4.07
SAMP SIZE	3	49	33	2	87
AV WEIGHT	3.34	4.14	4.68	2.80	4.28
STD ERROR	.00	.21	.23	.00	.14
SAMP SIZE	2	16	16	1	35

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